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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,450	11/24/2003	Sun-Oo Kim	2003 P 53738 US	6975
48154	7590	11/29/2005	EXAMINER	
SLATER & MATSIL LLP 17950 PRESTON ROAD SUITE 1000 DALLAS, TX 75252			EVERHART, CARIDAD	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/720,450	Applicant(s) KIM ET AL.	
	Examiner Caridad M. Everhart	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 and 41-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 41-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9-19-2005</u> . | 6) <input type="checkbox"/> Other: _____ |

Applicant's arguments with respect to claims 1-25 and 41-48 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by Ng, et al. (US 6,709,918B1).

Ng et al discloses a MIM capacitor (col. 2, lines 40-43). The capacitor plate metal can be Al or Cu(col. 1, lines 50-62), and the barrier for the plates can be Ti/TiN(col. 1, lines 55-60). It is shown in Fig. 4 that the plate and the barrier are self aligned(layers 24A and 26). The thickness of the barrier can be as low as 100 Angstroms(col. 6, lines 40-45), which satisfies the limitation of 450 Angstroms or less. The layers are electrically coupled together, as it can be seen in Fig. 4 that the layers are in contact.

Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Barth, et al. (US 2002/0102809A1).

Barth, et al. discloses MIM capacitor plates (paragraph 0001) with barriers which may be TaN, WN, Ta, and other materials(paragraph 0006) and the plates may be Cu

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or Al(paragraphs 0008 and 0015). The barrier may be more than one layer(paragraph 0024). It is shown in Fig. 4 that the barriers and the plate layers are self aligned and that the layers are electrically coupled, as they are in contact, as layer 18 is copper and layer 22 is barrier and layer 24 is insulator(paragraphs 0024 and 0025). Barth et al discloses that the layer 24 is a high dielectric constant material(paragraph 0041).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 4-25 and 41-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ng, et al. or Barth, et al as applied to claims 1-3 above, and further in view of in view of Otsuki, et al. (US 2004/0232467A1).

Neither Ng et al nor Barth et al disclose the recited materials nor the recited arrangements of the layers.

Otsuki, et al disclose a MIM capacitor(paragraph 105 and Fig. 5). There is disclosed a first conductive layer 61, a first thin conductive layer made of a barrier 62 and a conductor 63, and over that layer is formed a second conductive layer 65(paragraph 105 and Fig. 5 and paragraph 106). The barrier may be TiN, as Otsuki et al disclose that it is known to use TiN as a barrier(paragraph 0004). The thickness of the barrier is 400 Angstroms (paragraph 65), which satisfies the limitation that the first thin conductive layer comprises a thickness of 450 Angstroms or less. That the barrier layer can comprise TiN satisfies that the first barrier layer comprises Ti, and satisfies the limitation that the conductive layer comprises TiN, as the conductive layer comprises the barrier

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layer. In addition, the barrier may include a Ti film(paragraph 0004). The metal layer may be aluminum (last line of paragraph 109). Figure 8 shows layer 68 which may be formed as a barrier layer over the conductive layers(paragraph 108). The MIM capacitor also has a layer 64(Fig. 6) which is an insulator layer having high dielectric constant such as BST or Ta₂O₅ or other high dielectric constant dielectric(paragraph 105). Fig. 8 shows a thin conductive layer 62 a conductive layer 63, a dielectric 64, a conductive layer 65 and a conductive layer 68 on the layer 65. Layers 62 and 63 make up the bottom plate and layers 65 and 68 make up the top plate.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the high dielectric constant materials taught by Otsuki et al in the device taught by Ng et al or by Barth et al in order to obtain the benefit of the high dielectric constant material in the capacitor, which would be the increase in the capacitance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have arranged the first and second barriers in the recited arrangements because although Barth et al disclose a combination of the materials, it is conventional in the art to layer the barriers one on another. In addition, Ng et al disclose the layering of the barrier materials in the portions of Ng et al cited above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


CARIDAD EVERHART
PRIMARY EXAMINER

C. Everhart
11-26-2005